color indices are difficult to measure because of the bright, highly variable background. Plates in two colors clearly show that it is made up of red stars like those of the galaxy and the other globular clusters.

Demers (1969) has also measured four of the six Fornax globular clusters, with conclusions similar to those of this paper.

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OBSERVATIONS OF THE 5 μ SOURCE IN ORION

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Observations of the 5 μ source in the Orion nebula made over a two-year interval show that the source has not varied significantly in this period. The object is confirmed to be nonstellar in nature and the temperature, as suggested by the energy distribution from 2.2 μ to 5 μ, is near 650° K.

We have continued to observe the 5 μ source in the Orion nebula (Becklin and Neugebauer 1967) in order to gain a greater insight regarding the nature of this interesting object. Our observations were made at 1.62 μ (H), 2.2 μ (K), 3.4 μ (L), and 5.0 μ (M) with the photometric telescopes of the Lunar and Planetary Laboratory of the University of Arizona. The data are summarized in Table I and include the date of the observation, the effective beam size, and the measured magnitudes.

TABLE I

INFRARED MEASURES OF THE ORION 5 μ SOURCE

Date	Beam Size	H (1.62 μ)	K (2.2 μ)	L (3.4 μ)	M (5.0 μ)
JD 2439391	15″	—	4.62	1.30	—
39392	15	—	4.71	1.42	—
39410	15	10.0	4.64	1.60	—
39411	15	8.9	4.57	1.38	—
39412	15	9.1	4.57	1.20	—
39414	15	9.1	4.73	1.43	—
39415	15	9.7	4.62	1.44	—
39426	15	—	4.71	1.41	—
39569	30	—	4.36	1.30	—
39776	15	8.8	4.70	1.47	—
39777	15	9.4	4.59	1.36	—
39831	13	—	—	—	−0.08
39880	13	—	—	—	−0.22
39889	15	9.1	4.43	1.58	—
39951	30	8.0	4.24	1.24	—
39952	30	7.6	4.23	1.47	—
40196	15	9.8	4.66	1.65	—
40197	15	10.1	4.57	1.56	—
40260	15	9.0	4.53	1.40	—
40262	15	9.0	4.46	1.36	—
40263	15″	9.0	4.43	1.37	—
Means and Mean errors of mean	15″	9.3 ±0.2	4.60 ±0.03	1.43 ±0.04	−0.15 —
	30″	7.8 ±0.2	4.28 ±0.04	1.34 ±0.07	— —

The observed K magnitudes are plotted as a function of date in Figure 1. For purposes of comparison, we have also included the Caltech measurements (Becklin and Neugebauer 1968; Becklin 1968), which were made with smaller effective beams. Our 15 seconds-of-arc observations, which form a homogeneous set of measures spanning over 800 days, were taken at three distinct epochs for which mean K magnitudes and their mean errors were computed. The mean values, connected by the dashed line in Figure 1, suggest that the source may have brightened somewhat over the interval covered by our data, but the error bars are large enough to make this result problematical. Moreover, the same brightening is not seen at 1.62 μ or 3.4 μ. Thus, it is doubtful that this object has undergone any significant long-term variation over

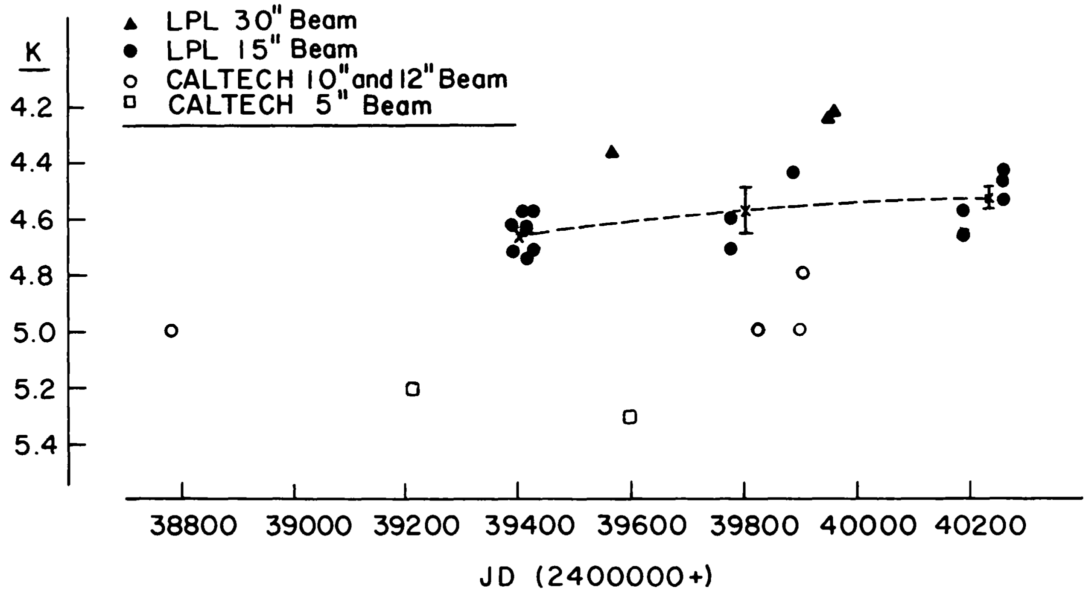

FIG. 1 — 2.2 μ measures of Orion 5 μ -source.

the past two and one-half years. However, in spite of the faintness of the source at 2.2 μ and the difficulties inherent in making the observations, the range of the 15 seconds-of-arc observations is suspiciously large and short-period variations cannot be ruled out. The strongest evidence that the source is indeed variable is seen in the most recent observations, which show a brightening in all three photometric bands.

The data shown in Figure 1, obtained with several beam sizes, indicate that the source is not strictly stellar—a fact also noted by Becklin and Neugebauer (1967), who reported emission wings up to 30 seconds-of-arc from the central core. From their 5 seconds-of-arc core and wing measurements and the 15 and 30 seconds-of-arc data of Table I, the radial distribution of 2.2 μ radiation has been approximated, the results of which are shown in Figure 2. The exact distribution near the center remains uncertain due to the unknown core size; the core point shown in Figure 2 results if the source fills the 5 seconds-of-arc beam, and therefore, it represents only a lower limit. In any case, the object exhibits a faint but sizable halo whose radiation gradually falls off and merges with the background of the H II region. Since the intensity at 5 seconds of arc from the center has already dropped to less than 10 percent of that of the core, the morphology of this source is very different from that of the

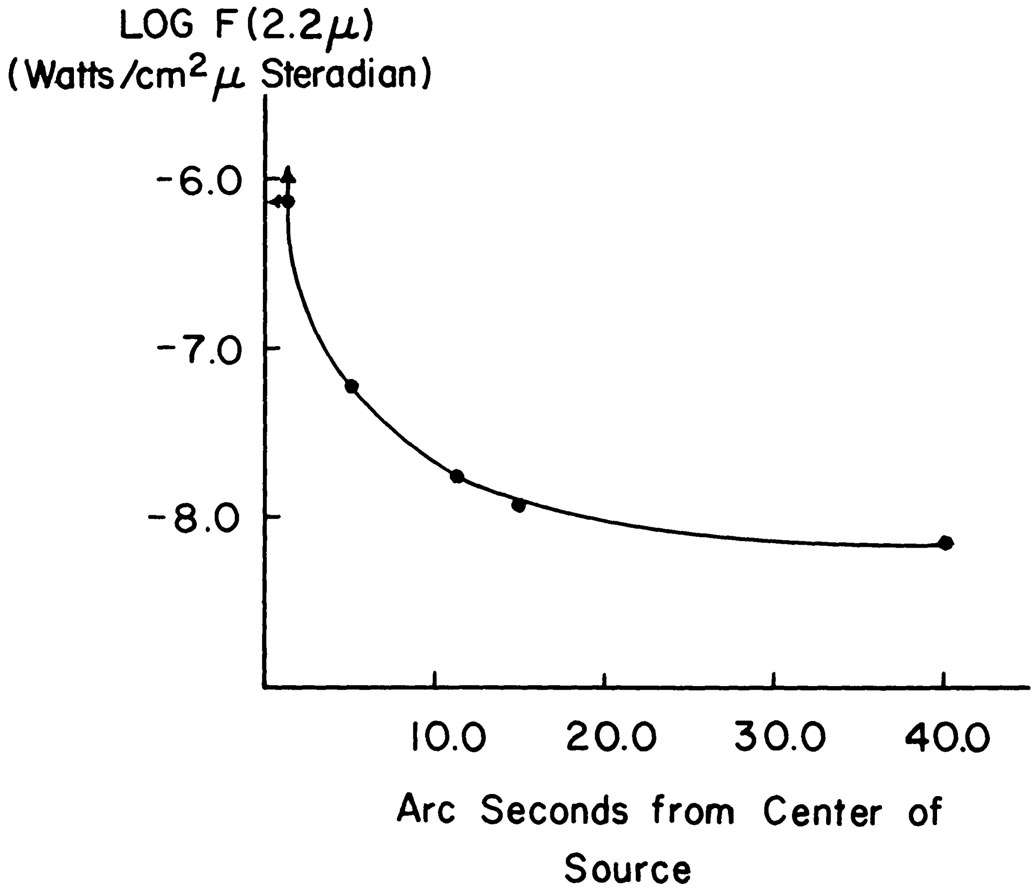

FIG. 2 — Structure of the Orion 5 μ source. Mean *K* magnitudes referring to specific beam sizes were determined from the data plotted in Figure 1. These values were then used to compute the radial distribution of 2.2 μ radiation. The points at 15 and 40 seconds of arc are from Becklin and Neugebauer (1967), who measured emission wings for this object.

extended 20 μ nebula found by Kleinmann and Low (1967), the center of which is only some 20 seconds of arc distant. In fact, Ney and Allen (1969) report that at 11.6 μ the two components, a bright stellar core and the extended wings, are superimposed.

Finally, we have used Johnson's (1966) absolute calibration and our 15 seconds-of-arc observations to compute the spectral energy distribution of the source. The 5 μ point on the curve, shown in Figure 3, represents the mean of two 13 seconds-of-arc observations made by Kleinmann and Low (1968). The intensity distribution is similar to that given for the central 5 seconds of arc by Becklin and Neugebauer (1967). From 2.2 μ to 5.0 μ the distribution is well

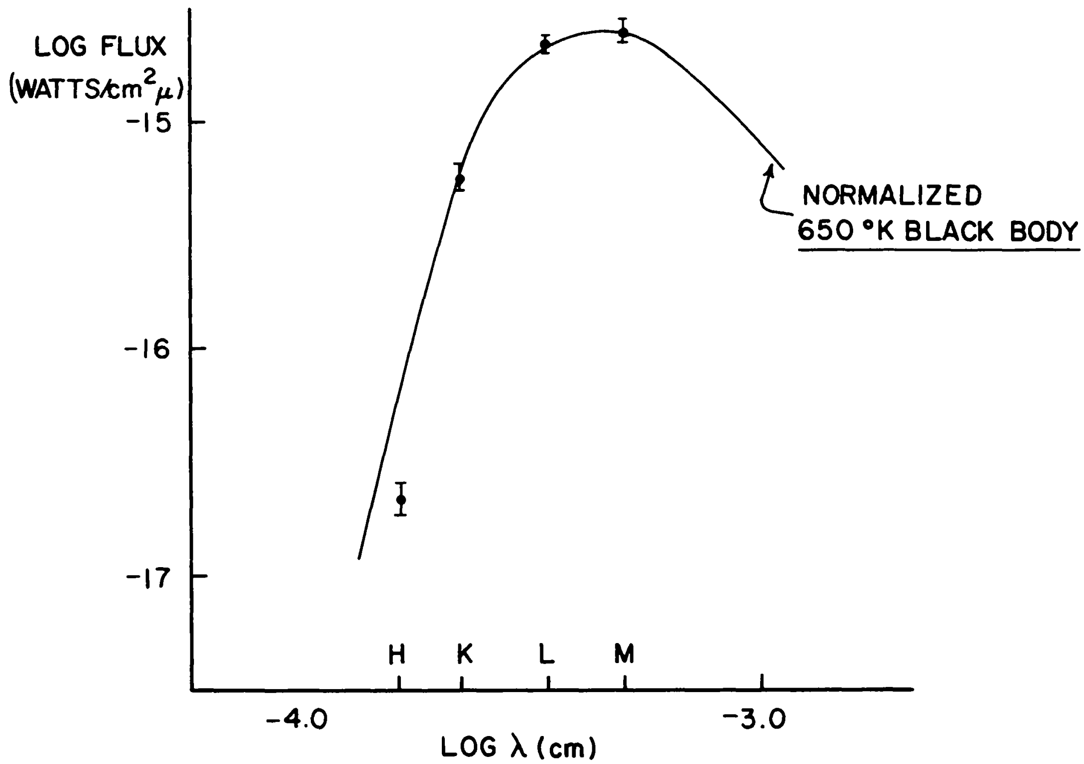

FIG. 3 — Energy distribution of 15 seconds-of-arc radiation. The mean 15 seconds-of-arc magnitudes from Table I are used here with two 13 seconds-of-arc 5 μ observations. The spectrum closely matches that of a 650° K blackbody at 2.2 μ, 3.4 μ, and 5 μ, but is deficient by a factor of three at 1.62 μ.

represented by a 650° K blackbody, but at 1.62 μ the source is deficient by a factor of three.

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